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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/084,917	03/01/2002	Yang Wang	ASH01004	7131

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EXAMINER	
TSEGAYE, SABA	
ART UNIT	**PAPER NUMBER**
2616	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/29/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/084,917	WANG, YANG	
	Examiner	Art Unit	
	Saba Tsegaye	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 October 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-14,16,17 and 19-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6, 8-14, 16, 17, and 19-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to the amendment filed 10/05/06. Claims 1-6, 8-14, 16, 17, and 19-27 are pending. Currently no claims are in condition for allowance.

Claim Rejections - 35 USC § 103

2. Claims 1-5, 16, 17, 19-21, 23 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ayres (US 6,687,220) in view of Shafer (US 2002/019874 A1).

Regarding claim 1, Ayres discloses, figs. 1-2, a routing system (20) comprising: a plurality of routing resources (CPU, routing domain, flow rates) and a plurality of virtual routers (VRIs 50 and 52) configured to share selected ones of the routing resources (a single processing unit; a communication interface 40 (DSPs); DRAM). In addition, Ayres discloses a plurality of a software configurable DSPs 42.

Ayres does not expressly disclose resources that are programmably modifiable.

Shafer teaches a router management interface that provides access to software modules and other resources residing on the router. Using the router management interface, the entities can make changes to the present router configuration and more efficiently manage router resources, policies and relation ships with other routers (page 1, 0004).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teachings from Shafer of resources that are programmably modifiable to the routing system of Ayres. The benefit using programmable resource is that programs can be changed and upgraded and new futures are added easily than hardware changes.

Regarding claim 2, Ayres discloses the routing system wherein the routing resources include logic resources (CPU; a communication interface 40 (DSPs)) and physical resources (ingress data queue; flow rate; routing domain).

Regarding claim 3, Ayres discloses the routing system wherein the logical resources include routing processes (a communication interface 40) and forwarding process (the CPU selectively retrieves packets from the ingress data queues and forwards them).

Regarding claim 4, Ayres discloses wherein the physical resources include control resources (each VRI 50 and 52 have its own routing domain; ingress data queues 48 formed as linked lists in the DRAM 46 (shared)) and data resources (the respective packet flow rates of the ingress data queues associated with the each VRI are independently adjusted; the system resources of the router 20 can be fairly distributed or restricted and individual user or VRI bandwidth guarantees (column 7, lines 29-59)).

Regarding claim 5, Ayres discloses the routing system wherein the shared selected ones of the routing resources includes routing processes (40), forwarding processes (CPU), control resources (ingress data queues 48 formed as linked lists in the DRAM 46), and data resources (the system resources of the router 20 can be fairly distributed or restricted and individual user or VRI bandwidth guarantees (column 7, lines 29-59))

Regarding claim 16, Ayres discloses a method comprising: allocating a first set of resources as shared resources (a communication interface 40 and a single control function (CPU), DRAM); allocating a second set or resources as non-shared resources (each VRI have its own routing domain; flow manager 54 controls the packets flow rates); and implementing a plurality of virtual routers (VRI 50 and 52) based on a sharing of resources from the first set of resources between the virtual routers (a single control function) and based on independently assigning resources of the second set of resources to the virtual router (the respective packet flow rates of the ingress data queues associated with the each VRI are independently adjusted; each VRI 50 and 52 have its own routing domain).

Ayres does not disclose that resources are user programmable.

Shafer teaches a router management interface that provides access to software modules and other resources residing on the router. The router management interface permits various entities, **such as human users and automated scripts, to configure the router**. Using the router management interface, the entities can make changes to the present router configuration and more efficiently manage router resources, policies and relation ships with other routers (page 1, 0004).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teachings from Shafer of user programmable resources to the routing system of Ayres. The benefit using programmable resource is that programs can be changed and upgraded and new futures are added easily than hardware changes.

Regarding claim 17, Ayres discloses the method wherein the first and second sets of resources are implemented by a single physical router system (see fig. 1, router 20).

Regarding claim 19, Ayres discloses the method wherein the resources of the fist and second set of resources include logic resources (a communication interface 40 and a single control function (CPU)) and physical resources (each VRI have its own routing domain; flow manager 54 controls the packets flow rates).

Regarding claim 20, Ayres discloses the method wherein the logic resources include routing processes (a communication interface 40, comprising a plurality of a software configurable DSPs 42 that processes (demodulates) upstream packets) and forwarding process (CPU selectively retrieves packets from the ingress data queues and forwards the retrieved packets to output queues).

Regarding claim 21, Ayres discloses the method wherein the physical resources include control resources (each VRI have its own routing domain) and data resources (flow manager 54 controls the packets flow rates).

Regarding claim 23, Ayres discloses a routing system comprising: means for performing routing processes (communication interface 40); means for performing forwarding process (CPU 44); means for implementing control resources (CPU 44); means for implementing data resources (Flow Mgr 54); and means for running a plurality of virtual routers (VRI 50 and 52)

that share selected ones of the means for performing routing processes, the means for implementing control resources and the means for implementing data resources (router 20; column 4, lines 28-40).

Ayres does not expressly disclose that resources are user programmable.

Shafer teaches a router management interface that provides access to software modules and other resources residing on the router. The router management interface permits various entities, such as **human users and automated scripts, to configure the router**. Using the router management interface, the entities can make changes to the present router configuration and more efficiently manage router resources, policies and relation ships with other routers (page 1, 0004).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teachings from Shafer of user programmable resources to the routing system of Ayres. The benefit using programmable resource is that programs can be changed and upgraded and new futures are added easily than hardware changes.

Regarding claim 27, Ayres discloses the routing system wherein the means for implementing data resources includes means for implementing a port bandwidth of the routing system (the respective packet flow rates of the ingress data queues associated with each VRI are independently adjusted).

3. Claims 8-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alfieri et al. (US 2002/0099849) in view of Shafer (US 2002/019874 A1).

Regarding claim 8, Alfieri discloses a network point-of-presence comprising: a physical router (14) system having a plurality of resources (routers; routing tables; communication links; memory; a mapping table; OSPF (*that is used to calculate routes by the number of routers, transmission speed, delays and route cost*); BGP (*BGP is a Gateway Protocol which routers employ in order to exchange appropriate levels of routing information*) etc.); at least one backbone router (VBR 22) implemented as a virtual router by the physical router system (14); and at least one regional router (VAR 20) implemented as a virtual router by the physical router system (14), wherein the backbone virtual router (22) and the regional virtual router (20) share resources of the physical router system (see figs. 2-5; 0033-0036).

Alfieri does not expressly disclose resources that modifiable by a user.

Shafer teaches a router management interface that provides access to software modules and other resources residing on the router. The router management interface permits various entities, such as **human users and automated scripts, to configure the router**. Using the router management interface, the entities can make changes to the present router configuration and more efficiently manage router resources, policies and relation ships with other routers (page 1, 0004).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teachings from Shafer of a programmable resource to the routing system of Alfieri. The benefit using programmable resource is that programs can be changed and upgraded and new futures are added easily than hardware changes.

Regarding claim 9, Alfieri discloses the network POP further comprising: ports connecting the backbone virtual router to a high capacity transit network (fig. 2, backbone links 18); and ports connecting the regional router to a metropolitan area network (links 16).

Regarding claim 10, Alfieri discloses the network POP wherein the physical router is a single physical router (router 14).

Regarding claim 11, Alfieri discloses the network POP wherein the plurality of resources includes logic resources (0032, 0037) and physical resources (routing tables, communication links).

Regarding claim 12, Alfieri discloses the network POP wherein the logic resources include routing processes (0037) and forwarding processes (0032).

Regarding claim 13, Alfieri discloses the network POP wherein the physical resources include control resources (each VAR 20 has its own routing table; the VBR 22 maintains a full BGP routing table (0023-0024, 0036)) and data resources (see fig. 4 and 5).

Regarding claim 14, Alfieri discloses the network POP wherein the control resources include at least one routing table (each VAR 20 has its own routing table; the VBR 22 maintains a full BGP routing table (0023-0024, 0036) and the data resources include transmission bandwidth of at least one port of the routing system (as shown in fig. 4, a number of physical

interfaces 50 connect to the access links 16 and 18 (ports). Examples of such interfaces include Ethernet interfaces, SONET interfaces etc.).

4. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ylonen et al. (US 2002/0062344) in view of Shafer (US 2002/019874 A1).

Regarding claim 1, Ylonen discloses, in Fig. 1b, a plurality of virtual routers 110-112 (claimed a plurality of virtual routers) that use the **same hardware**, (i.e. the physical input lines and output lines) and **same processor** 116 (claimed a plurality of routing resources). The virtual routers are separate entities and suitable multiple access scheme is applied to **share the common physical resources** between them (0004).

Ylonen fails to disclose resources that are programmably modifiable.

Shafer teaches a router management interface that provides access to software modules and other resources residing on the router. Using the router management interface, the entities can make changes to the present router configuration and more efficiently manage router resources, policies and relation ships with other routers (page 1, 0004).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teachings from Shafer of resources that are programmably modifiable to the routing system of Ylonen. The benefit using programmable resource is that programs can be changed and upgraded and new futures are added easily than hardware changes.

Regarding claim 2, Ylonen discloses the routing system wherein the routing resources include logic resources (processor) and physical resource (same physical input lines 114, output lines 115).

5. Claims 6, 22, 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ayres in view of Shafer as applied to claims 1 and 23 above, and further in view of Alfieri.

Ayres in view of Shafer discloses all the claim limitations as stated above. Ayres, further, discloses that the router 20 includes **a shared buffer memory 46** and each VRI 50 and 52 have its **own routing domain** (as in claim 26). However, Ayres does not expressly disclose the control resources include at least one routing table.

Alfieri teaches several virtual access routers 20 and virtual backbone router 22 that are associated with respective customers. Each VAR 20 has its own routing table and runs its own instances of the routing protocol. The VBR 22 generally maintains a full BGP routing table. Further, Alfieri teaches that wide-area network 10 may employ routing protocols such as BGP, OSPF, RIP, etc. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add routing table, such as suggested by Alfieri, to the VRI of Ayres in view of Shafer in order to provide an efficient and reliable communication system.

Response to Arguments

Applicant's arguments filed 10/05/06 have been fully considered but they are not persuasive. Applicant argues (Remarks, page 3) "*Ayres generally discusses virtual routers, Ayres does not appear to be particularly concerned with how resources are allocated to the virtual*

routers, much less disclose or suggest virtual routers that share routing resources in accordance with a programmably modifiable resource sharing configuration". Examiner respectfully disagrees. Ayres clearly discloses that virtual routers share routing resources (such as: CPU, shared memory, single control function). Further, Ayres discloses that at the router 20, the communication line 36 from the PSTN 26 are terminated at a communication interface 40, comprising of a software configurable DSPs 42. As known, in software-based machine, programs can be changed and upgraded and new futures are added easily than hardware changes. Shafer teaches a router management interface that provides access **to software modules** and other **resources residing on the router**. In particular the router management interface permits various entities **such as automated scripts** to configure the router and obtain operational information. Using the router management interface, the entities can make changes to the present router ***configuration and more efficiently mange router resources, policies and relationships with other routers***. The Examiner believes that the combination of Ayres reference and Shafer reference is proper and therefore, the rejection is maintained. The Examiner also notes that the Applicant only claims a plurality virtual routers configured to share the routing resources but does not go into details how resources are allocated to the virtual routers.

Applicant further argues, "*Shafer does not disclose or suggest that the disclosed interface can be used to configure virtual routers to share routing resources in accordance with a programmably modifiable resource sharing configuration*". It is respectfully submitted that the rejection is based the combined teaching of Ayres patent and the Shafer patent. As stated above Ayres discloses a plurality of virtual routers that share a plurality of routing resources.

Applicant argues (Remarks, page 5) that although Ayres generally discusses virtual routers, Ayres does not appear to be particularly concerned with how resources are allocated to the virtual routers, much less that the shared routing resources include the particular resources recited in claim 5". Examiner respectfully disagrees. Ayres discloses routing processes (received packets processed and held in respective ingress data queues formed as linked lists (see column 4, lines 65-67)) forwarding process (the router 20 receives data packets from a plurality of different end users and based routing information such as destination address forwards the packet to the appropriate destination), control resources (queues 48a,b; furthermore, it inherent to use routing table and packet forwarding protocol in order to forwards packet to the appropriate destination) and data resource (column 7, lines 40-56). The Examiner also notes that the Applicant only claims a plurality virtual routers configured to share the routing resources but does not go into details how resources are allocated to the virtual routers.

Applicant argues (Remarks, page 8), "*the possible router configuration options described by Ayres and Shafer do not disclose or suggest that resources included in a first set of resources and resources included in a second set of resources are user programmable as recited in claim 16*". Examiner respectfully disagrees with Applicant assertion. Ayres clearly discloses a method that a first set of resources as shared resources (*a plurality of virtual routers (50, 52, as shown in fig. 2) that share resources (a single central processing unit 44, shared buffer memory 46, a single control function..*) and allocating a second set of resources an non shared resources (*each VRI have its own routing domain; the respective packet flow rates of the ingress data queues associated with the each VRI are independently adjusted*). In addition, Ayres discloses a plurality of a software configurable DSPs 42. Further, Shafer assists by using a router management

interface, human users and automated scripts can make changes to the present router **configuration and more efficiently mange router resources, policies and relation ships with other routers** (see 0004). In addition, Shafer teaches that routers maintain tables of routing information and exchange data and share resources. The Examiner believes that the combination of Ayres reference and Shafer reference is proper and therefore, the rejection is maintained. The Examiner also notes that similar arguments were presented regarding claim 23 on pages 8-9. The Examiner takes the same position.

In the Remarks, on pages 9-10, Applicant argues that *Alfieri does not disclose or suggest that the resources that are shared between routers are modifiable by a user, as recited in claim 8. Further, Applicant argues that Shafer does not cure the deficiencies of Alfieri and none of the router management operations described in Shafer relate to modifying resources that are shared between virtual routers as recited in claim 8.* Examiner respectfully disagrees. Alfieri discloses virtual routers that share resources. Alfieri also shows, in fig. 4, a high-level software and hardware organization for a router 14. Further, Alfieri discloses that changes to underlying physical network (includes manual reconfiguration and automatic protection switching) result in the need to change routing tables and other data structures in the routing subsystem. The Examiner believes that Alfieri suggest that resources that are shared between routers are modifiable by a user. Further, Shafer assists by using a router management interface, human users and automated scripts can make changes to the present router **configuration and more efficiently mange router resources, policies and relation ships with other routers** (see 0004). In addition, Shafer teaches that routers maintain tables of routing information and exchange data and share resources. Therefore, the Examiner believes the rejection is proper. The Examiner also

notes that similar arguments were presented on page 13 (claims 6, 22 and 24-26). The Examiner takes the same position.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Saba Tsegaye whose telephone number is (571) 272-3091. The examiner can normally be reached on Monday-Friday (7:30-5:00), First Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doris To can be reached on (571) 272-7629. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ST
December 22, 2006

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